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Title: Modelling groundwater recharge, actual evaporation and transpiration in semi-arid sites of the Lake Chad Basin: The role of soil and vegetation on groundwater recharge

The authors test an experimental approach for assessing groundwater recharge in Lake Chad Basin based on a small number of field data and available remote sensing products. This set of data consists of soil water content values and chloride concentrations at different soil depths over 6 experimental soil profiles. The low-cost data set is implemented in Hydrus-1D for simulating groundwater recharge

The evaluation of this manuscript is based on the following questions:

1) Is it a novel work based on a reliable scientific technique?
2) Is it clearly structured and well-written?
3) Are the experimental design and analysis of data adequate and appropriate to the investigation?

The authors should stress on the novelty of this paper. In my understanding, they try to provide an affordable low-cost approach in a data-poor region to assess groundwater recharge. Nevertheless, the description of Materials and Methods is poorly described, unclear and some parts are "gray". Precipitation and ET are given at monthly scale. The authors then declare that they set up Hydrus-1D at monthly scale (line 185). As far as I know, time units in Hydrus-1D are seconds, minutes, hours, days and years. The authors are invited to give more detailed information on the Hydrus-1D version. Did the authors use year fractions? In any case, running Hydrus-1D at monthly scale provides only a gross water balance simulation.

The manuscript is potentially interesting for the readers, however it needs substantial revisions before publication in light of the following comments:

1) I invite the authors to thoroughly revise Materials and Methods by adding a methodological sub-section in which they describe step-by-step the proposed approach. Maybe they can add a flowchart, a schematic overview to clarify all steps.
2) Session 2.5 is very unclear. I suggest to substantially revise this part. The authors declare that they have monthly P and ET from 1970 to 2019 (line 123). Then in line 192 they set up a burn-in period of 80 years to relax the impact of unknown initial conditions on model simulations. How can this be possible? In Fig. 6 I see simulations of groundwater recharge from 2005 up to 2019. I do not understand the impact of the 7 scenarios on model results.
3) In sub-Session 2.5.2 the authors use the bulk density in Rosetta in Hydrus-1D. How can you sample a known soil volume from the auger? Please clarify it in sub-session 2.3. It is recommended to add the Richards equation, the van Genuchten (1980) equation for soil

water retention function and hydraulic conductivity function by declaring all soil hydraulic parameters (θr, θs, n, α and Ks)

4) The description of scenarios and model calibration in section 2.5.5 and 2.5.6 is unclear at all. I don't know if I got the description. Since the authors do not know the values of Kcp, Ke and root depth, they organize 7 scenarios (Table 2). In each scenario they run inverse modeling to optimize the five unknown van Genuchten parameters (θr, θs, n, α and Ks) given in Table 3. The authors should list the parameters they optimize with the inverse modelling exercise in Session 2.5.6. The authors use Rosetta PTF to set initial parameter values. Then the calibration results are presented in Table 3 and Table 4 and Figure 5, 6 and 7.
5) Finally the authors try to poorly interpret ET dynamics in Section 3.4

Given the 5 points listed above, the manuscript seems a calibration exercise supported by scarce information. What is the novelty of this study?

Authors should mention in the conclusion where Hydrus-1D can be improved or any suggestions for future research in terms of models' performance improvement and application.